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IV. *Account of a Book. La Meridiana del Tempio de S. Petronio , &c. i. e. The Meridian Line of the Church of St. Petronio drawn and fitted for Astronomical Observations in the Year 1655. revised and restored in the Year 1695. by Signior John Dominico Cassini, Primary Astronomer of the School of Bononia, Pontifical Mathematician, of the Royal Academy of Sciences, and R.S. Printed at Bononia 1695. in Twenty Two Sheets in Fol.*

IN this Book (written in part by Signior *Cassini*, whilst in *Italy*, but augmented and published by Signior *Dominico Guglielmini* after his departure thence) there is an Account given of the Occasion of the making of this Meridian Line by *S. Cassini*, in the Year 1655. of the Method of doing it, and of the Exactness with which it was performed at that time by him : Then of the Uses that have been made of it, and of the Alterations that have happened to this Church since that time, and of the Restauration and Verification of it in the Year 1695. by the said Signior *Cassini* himself ; and lastly, of the Uses that may be made of it for the future.

To this Discourse, which was written by Signior *Cassini* himself, is adjoined a Discourse of Signior *Dominico Guglielmini*, Mathematician and Publick Lecturer of *Bononia*, giving an Account of the Operations made, and of the Instruments employed in this last Restauration of the said Meridian Line.

In the first Section *S. Cassini* says, this Verification was the more considerable, *First*, because it fell out to be made the Year before the last Intercalation of the Gregorian Account (which was first established in the Year 1582. Since which time no Intercalation has been omitted, but the first is to be omitted in the Year 1700. to reduce the Anticipation of the Equinoctials since that time, and so to make the Day of the Vernal Equinox to be the 21th of *March*) By which opportune Occurrence, this Line would afford a proper means to observe exactly the time of the Sun's Ingress into *Aries*, or of its passing the Equinoctial Circle. *Secondly*, Because it would be a means for determining a Controversy now much agitated among learned Men; to wit, Whether the Positions of the Meridians and Parallels of Places on the Surface of the Earth, do really alter or not. For that not only the present Postures of them are found very differing from those assigned them by the ancient Geographers: But considerable Differences are also found out amongst the more modern Observations, as in the present Meridian of *Uraniburg*, which has lately been found by Monsieur *Picart*, *Erasmus Bartholinus*, and others, to vary 18 Minutes towards the East, from that fixed by the Noble *Tycho Brahe*, about 100 Years since. And the great Pyramid of *Egypt* has been very lately found to stand in a Posture that Two of its sides do respect the South. Now Signior *Cassini* having found by this last Rectification of his Meridian Line, that both the Meridian and Parallel of *Bononia*, have not been altered or changed now after 40 Years space, conceives that there has not ever been any such Alteration as is supposed, but that those Differences that have been found at distant times, have been occasioned by the Defects or Mistakes of the Observations themselves: Whence he conceives that the accurate Astronomer, *Tycho*, was mistaken in the

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Position of the Meridian of *Uraniburg*. And as to the present Position of the Pyramid, he supposes it was at first so placed. But because, notwithstanding his Observations, he found that many were of a contrary Sentiment, and that it had partly been occasioned by a Meridian formerly fix'd in this Church, he in the next Section gives an Account of that old Meridian Line: and the occasion of the first making of this (he says) was for the rectifying the time of *Easter*, and the Feasts of the Church which depend upon the true time of the *Vernal Equinox*. For the Prelates of *Alexandria* (who when deputed by the Council of *Nice* to state that time) found it then to be on the 21th of *March*. But Pope *Gregory* being informed that in his time it fell on the 11th of that Month, he altered the Julian Account, and made the 11th to be the 21th of the same Month. This was the occasion that *Ignatio Dante* (Publick Lecturer of Mathematicks at *Bononia*) first made a Meridian Line in the Pavement of the Church of *St. Petronio*, in the Year 1575. Seven Years before the Alteration made of the *Julian* Account, and the establishment of the *Gregorian*, in the Year 1582. But this Line of *Dante's* having been found to vary from the true Meridian of the Place, and so to be serviceable only for the observing of the Solstices (it varying 8 or 9 Degrees from the North towards the East) and it being supposed to be so misplaced at first by reason of the Obstruction of the Pillars of that Church, was the occasion of Signior *Cassini's* finding a fitter Place in the same Church, and of fixing there his new Meridian Line, in the Year, 1655. the Place where, and the manner how, he has more particularly and fully expressed in this Discourse. And because it was of so considerable, and as it were, of Sacred use to the Church (the Feasts thereof depending on the Rectification of the time made by it) he names all the eminent Astronomers, who were his Concomitants and Assistants in the Operations, as Witnesses of the Exactness of them. After this (he relates several Variations that have happened to the Fabrick, since he first fixed this his Meridian Line, and thereby shews the Necessity and Use of the Restauration and adjusting of it for the time to come, by which any farther Alteration that may happen to that Building, or otherwise for the Future, may be so far discovered and remedied, and the essential parts of this Line so far restored and rectified, that they shall be as effectual, as if no Alteration had happened.

ed. The Uses of which will be not only to show the true time of the Sun's ingress into the Tropick and Equinoctial Points, but likewise into all the other Eight Signs; and so will serve for the verifying and rectifying of the Calendar, the same being now so placed, as that the Perpendicular height of the Hole, by which the Light is admitted (which is an Inch in Diameter) is 1000 Inches of the Parisian Foot above the Pavement, and the Meridian Line, which is as a Tangent to it, has the Tangent of 45 Degrees actually divided into 100000 Parts upon one of the Marble Cheeks that border the Ruler or Lath of Iron that expresses the Meridian Line in the Floor of the Church, and upon the other Cheek of Marble are marked the Degrees, &c. of the Distance of the Sun from the Zenith, whereon are also marked the Places of the Signs of the Ecliptick. From the Observations made by this Line, Sig. *Cassini* calculated his Tables of Refractions, which have been since verified by many other Observations, both of himself and others.

These Considerations induced the Sentors of *Bononia* (who had the Care of the Edifice of *St. Petronio* committed to them) to be at the Charge of repairing the said Meridian Line, and to take care that it should be preserved for the future. For which intent they not only caused the Instruments made use of in the fixing this Line to be safely preserved, but they also desired Signior *Guglielmini* to make so perfect a Description of them, that in case of their Decay, it might be known how to supply and make use of them for this Purpose for the future. Which intention and Desire the said learned Professor has fully prosecuted and compleated in his Discourse subjoined to that of Signior *Cassini*, and he hath also added some useful Tables, as that of the parts of the Radius, answering to the Divisions of the Tangent into Degrees, Minutes, &c. Secondly, Those of the Refractions and Parallaxes of the Sun at several Altitudes. Thirdly, A Table of Declination of every Point of the Ecliptick, answering to the Minutes of Declination for the present Obliquity of the Ecliptick, which he makes to be 23°. 29'. 12". He adds also, That he himself by accurate Observations, finds the height of the Pole at that Church to be 44°. 30'. 15". which is 1'. 15". greater than what *S. Cassini* had found it in the Year 1655. All which Particulars, and divers other very remarkable, may be found in the Book it self, to which therefore I refer the Reader. V. A